

Images from mirrors

- Understand difference: Object - Image

- Images can be:

- real or virtual
- erect (M>0) or inverted (M<0)
- enlarged (|M|>1) or reduced (|M|<1)

- mirror formula:

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} = \frac{2}{R}$$

- sign convention: (see Table 26.1)

- p,q positive on the left, negative on the right
- f,R positive for concave mirror, negative for convex mirror
- if light approaches from the left

- magnification:

$$M = -\frac{q}{p} = \frac{h'}{h}$$

Images from lenses

- Images can be:

- real or virtual
- erect (M>0) or inverted (M<0)
- enlarged (|M|>1) or reduced (|M|<1)

- thin lens formula:

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$$

- sign convention:

- p positive (real) on the left / negative (virtual) on the right
- q positive on the right, negative on the left
- f positive for convex lens (converging)
- f negative for concave lens (diverging)

- magnification:

$$M = -\frac{q}{p} = \frac{h'}{h}$$

Ray Tracing

● For Mirrors:

- parallel ray passes through focal point
- focal point ray is reflected parallel to principal axis
- ray incident at vertex reflected about principal axis
- radial ray (through center of curvature) reverses direction

● For Lenses:

- parallel ray passes through focal point
- ray through/from/towards focal point becomes parallel
- ray through center of lens is not deviated